Toward integrated medical resource policies for Canada: 7. Undergraduate medical training

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This is the seventh in a series of articles[1-6] based on the report *Toward Integrated Medical Resource Policies for Canada*,* prepared for the Federal/Provincial/Territorial Conference of Deputy Ministers of Health[7-9] and the fourth to address a specific policy area.[4-6]

In this article we summarize our analysis of the key problems in Canadian undergraduate medical training and our policy suggestions. We touch on four topics: the admissions process, enrolment numbers, undergraduate medical curricula and the provision of information to undergraduates on the context of medical practice. We focus on the topic that seems to have drawn the most attention since the release of our report — enrolment numbers. The other three will be discussed again in future articles. What follows is drawn primarily from the full report.[8]

Problems and causes

In our report we took some care to distinguish between fundamental problems and their underlying causes. The specialty and geographic distribution and the overall supply of physicians are major policy problems in all industrialized nations.[9] Any policy package that is to succeed in addressing these problems must target the underlying causes. In the case of specialty and geographic distribution these include undergraduate admissions policy, curricula and student information; in the case of overall supply they include Canadian undergraduate enrolment.

The nature of the problems

Specialty and geographic maldistribution

Since these topics will be discussed in depth in future articles we deal with them only briefly here. The problem in specialty distribution appears to be the clustering and oversupply of some specialties and subspecialties (as well as of general practitioners) in large cities, which leaves many smaller centres with inadequate or difficult access to specialty — even primary care — services.

We found widespread agreement that geographic maldistribution was one of the major problem areas for physician resource policy. Despite many years of rapid increases in physician surplus the geographic distribution of even primary care practitioners remains uneven.

Overall physician supply

There are three fundamental issues. First, since the early 1950s physician supply in Canada has been

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increasing far faster than the size of the population. Recent statistics suggest that this trend levelled off during 1990 and 1991,[10] but it will take more than 2 years of data to confirm a break in a 40-year trend.

Second, there is no compelling reason for the public to have supported these continuous increases in supply. Some have argued, with almost religious fervour, that ever-increasing numbers of physicians can solve the problem of meeting all present and future health care needs (see, for example, references 11 and 12). However, many studies of physician requirements are plagued by fundamental errors: in summary, the unjustified assumptions that all "utilization" represents "needs being met" and that all factors affecting future needs will *increase* future physician requirements.[13-15]

Yet there is growing recognition that the leap of faith from "more medical care" to "better health" is fragile.[16] An internal investigation of clinical practice at a hospital in Victoria explicitly identified the oversupply of urban general practitioners as a major determinant of the poor and often dangerous care at that hospital (*Victoria Times-Colonist*, Nov. 29, 1990: A1-A2; Dec. 1, 1990: A1-A2). Even Canadian regulatory bodies have suggested that continued increases in the supply of physicians may have negative consequences for the quality of patient care (see the comment by Dr. Michael Dixon, registrar of the Ontario College of Physicians and Surgeons in 1986[17]). Outcomes research in Canada and elsewhere has consistently demonstrated that a substantial proportion of care is inappropriate, because the services are unnecessary or the problems could have been addressed more cost-effectively.[18-22]

However, this may represent only the tip of the iceberg. The wide and dramatic variations in rates of hospital admission, surgery, and use of physician services and drugs across regions with similar populations[23-25] are not always explained by differences in the rates of inappropriate care. "For many diagnoses there appears to be quite enormous uncertainty concerning the appropriate method of treatment."[26] Differences in physicians' views about appropriate intervention for particular patients and conditions likely underlie many small-area variations.[27] Furthermore, the patterns of care prescribed by physicians tend to be more interventionist than patients would choose when given adequate information on disease history and outcome probabilities and effects.[23]

In short, in many areas there is no evidence that current patterns of medical care and, therefore, current physician supply are optimal for population health. In fact, the increasing physician supply in Canada may have impeded organizational and financial change and thus have adversely affected health as well as finances.[28]

The third fundamental issue of physician supply is the "opportunity cost" to Canada, in an increasingly competitive "high-tech" international environment, of using the talented and scarce human resources that are funneled into clinical practice careers. Committing resources to medical care does not improve Canada's competitive position. Medical care does not create new wealth;* much of it is extremely valuable in terms of length and quality of life, and all of it is "productive activity" in the narrow economic sense that economic benefits accrue to the human and other resources that go into providing it. However, none of that activity is costless from a broader, societal perspective. In particular, individuals trained as and committed to being physicians are thereby unavailable for other productive purposes offering potentially greater collective benefit.

In this respect we disagree strongly with a commonly held (and not just Canadian) view that "a shortage of doctors entails significantly greater social costs than does an excess."[29]† History has shown clearly that to demonstrate a surplus requires different information from that needed to demonstrate a shortage.[14] In fact, it remains difficult to find stakeholders who can articulate explicit criteria by which they would conclude that there was a local area surplus of any type of physician; the difficulty of identifying shortages is much less taxing.[30] History has also shown that to create new economic activity is politically much easier than to unravel already established activity: "It is always easier to expand than to contract — particularly in medicine, a profession that seems to have lost its ability to control its own growth."[31] These historical asymmetries suggest that "undershooting" (were it to happen) is likely to be considerably less harmful than some parties would have us believe.

Underlying causes

Specialty and geographic maldistribution

From our interviews and from a literature re-

**One exception is the case of physicians who engage in research that results in the development of new products and services with widespread application internationally. However, for most physicians trained in Canada who go on to clinical practice this is irrelevant.*

†The term "shortage" means different things to different people — for example, an economic shortage may be said to exist when demand exceeds supply at the prevailing price, regardless of any considerations of the health effects of the contemplated transactions. Some would argue that a shortage of health care personnel exists any time and any place that health care interventions would improve the health status of at least one patient. There are many variants on these economic and clinical definitions.

view we concluded that who is selected for medical school will influence career decisions and practice patterns of future physicians.[32] For example, some have suggested that students from rural areas are more likely to return to such areas to practise, although others have suggested quite the opposite — that the reason why rural-area students seek medical training is to escape from those areas. Some of those interviewed felt that admissions criteria that gave greater weight to cognitive ability and nonacademic life skills could influence choices about both location and specialty.

Mentioned more often during our interviews was that Canadian medical schools have been slow to adapt their undergraduate curricula to expose students to specialties for which there is more need (e.g., geriatrics, mental health, and alcohol and drug-related problems) and to a mix of practice settings that more closely match what is required in the community.

We also heard that there is little or no information available to students on the context of medical practice when they begin to think about career decisions. Major decisions such as specialty choice and practice location are influenced more by peers, information about finances and clinical lifestyle, and faculty role models than by population needs or practice opportunities in alternative health service delivery models.

Overall physician supply

Domestic training continues to provide most of the additions to Canada's physician supply. The current capacity of Canadian medical schools is a direct result of the recommendations in 1964 of the Royal Commission on Health Services.[33] Yet the underpinnings of those policy recommendations have not received much public scrutiny in the last quarter-century.

Ryten and Watanabe noted that "faculties of medicine kept very close to the commission's recommendations until 1981/82. Since then, admissions have been well below the recommended levels. . . . It can by no means be claimed that Canadian faculties of medicine expanded their capacity irresponsibly" (*Globe and Mail*, Toronto, May 19, 1987: A7). They went on to note that "the forecasts and projections upon which the commission's recommendations were made turned out to be wrong in several critical areas, particularly population." The factual parts of these statements are correct; the interpretive parts are more open to question. Like "shortage" the term "responsible" clearly means different things to different parties.

The commission interpreted the results of the research on this matter to imply that "the problem of providing sufficient medical school facilities to supply Canadians with the present or an improved level of medical services requires *immediate* attention."[34] It recommended the development of four new medical schools and significant expansion of existing facilities to produce just over 1859 medical graduates yearly by 1991; but on the same page it noted an important rationale for these recommendations: "We believe that the maintenance of the *1961* [our emphasis] population–physician ratio is a realistic goal." The 1961 population per physician was 857.

In Table 1 we compare the Hall Commission's projections for 1991 with actual data for the late 1980s. Without exception the estimates and assumptions accepted explicitly in the recommendations erred on the side of fostering domestic overproduction of physicians. Population was overestimated by almost 30%, and attrition from both the ranks of practising physicians and medical training was

Table 1: Comparison of Hall Commission[33] projections for 1991 with actual data for the late 1980s

Variable	Hall projection	Actual
Population	35 106 700	27 296 859*
Annual attrition rate from physician numbers (deaths, retirements, emigration)	3.0%	2.5%†
Attrition rate from medical school enrolment to graduation	10.0%	3.5%‡
Annual number of physicians immigrating	300 (1971–80) 250 (1981–90)	450–650§

*1991 population.
†Based on data tapes from Southam Communications Limited of *Change of Activity Status* for 1986 to 1989.
‡Eva Ryten, Association of Canadian Medical Colleges: personal communication, 1990.
§A single reliable source is not available. This range is based on data from the Department of Employment and Immigration on new immigrants' statements that medicine is their intended occupation and from the Southam data tapes.

overestimated. Immigration of foreign physicians was severely underestimated.

Sceptics may hasten to suggest that much has happened since 1964 in population structure (as distinct from size) and in technology and clinical knowledge. However, the commission's calculations incorporated assumptions about improvements in technology that on balance were assumed to call for additional physicians; they also included adjustments for demographic changes. The influence of the commission's recommendations is reflected in the fact that the projected 1991 graduating class of 1850 students is remarkably close to the Canadian peak of 1835 reached in 1985.[35] Unfortunately the recommendations for new training capacity were enthusiastically embraced, whereas their most fundamental justification suffered from malignant neglect.

Supply policy considerations

We do not wish to imply that 857 is an appropriate population-physician ratio for Canada. As we have noted before[2] there is no magic ratio. But we have nothing in our arsenal of evidence to suggest that a figure of 515 is any more appropriate. Certainly there have been many advances in effective clinical technologies and techniques since the early 1960s that would suggest the useful deployment of more physicians in Canada than the 32 000 implied by the 857 figure. On the other hand, in the years since the Hall report two other countervailing factors have emerged.

First, compelling evidence suggests that personnel less highly trained than physicians could be deployed in certain areas of medical service delivery and provide equally competent care. Although the most frequently cited example is the nurse-practitioner, who may be able to provide as many as one-third of general practitioner services,[36] there is also evidence that psychologists and social workers could be substitutes in psychiatry.[37] Furthermore, physiotherapists, social workers, family counsellors and various technicians currently working in teams under physician supervision (or even independently in certain situations and for certain types of conditions) all represent significant but largely untapped substitution potential. This team approach may be particularly relevant in the care of the elderly, for whom social support and palliative care needs may be more pressing than needs for "curative" clinical interventions by physicians.[38] Much of physician resource policy discussion continues to proceed as if this evidence did not exist or were somehow irrelevant to the debate. The greater the supply of physicians the less likely we are to see constructive dialogue about policy initiatives that would capture this efficiency-enhancing substitution potential.

Second, although the value of much medical care is unquestionable, there is no longer any serious doubt that some services delivered by physicians are unnecessary and the manner in which others are delivered is inappropriate.

The training of physicians represents long-term, largely irreversible investments in scarce and highly talented human capital. This creates pressure for new equipment, much of which has a very long half-life[39] and the effective use of which is increasingly being questioned. Decisions about the number of physicians we train are far more than simple decisions about how many Canadian students will have the opportunity to become physicians; these decisions have long-term effects on the students admitted to training, on health care and health, and on other missed productive opportunities.

There is no magic ratio and therefore no "right" number of medical graduates, but all these considerations provide compelling reasons to adjust the training capacity of Canada's medical schools. A further reduction (since there has been a reduction of about 100 positions, or 6%, since 1983-84[40]) would go some way to recognizing the inaccuracy of the assumptions on which the rapid expansion in training capacity was based, the potential for substitutability of health care personnel and the current overprovision of medical services.

The three most frequently cited reasons for not reducing Canadian undergraduate enrolment are that it would compromise high-quality medical education (when funding is tied to enrolment), it would reduce the opportunities for young Canadians to become physicians, and it would not affect physician supply, because more graduates of foreign medical schools would simply fill in.[4,17]

The problem in the first reason can be directly solved through changes in the funding of academic medical centres.[5] With respect to the second reason, opportunities for young Canadians to practise medicine or any other profession have always been severely rationed. The current ratio of applicants to entrants (Canadian citizens and landed immigrants) is about 4:1.[40] There are undoubtedly many more who covet a career in medicine than the 7000 or so formal applicants annually.

The opportunity costs of our past production excesses, however, will be with us for a long time; we must be particularly sensitive to the social and personal costs of continuing such excesses. Many countries have large and rapidly increasing pools of unemployed physicians.[41] This seems unlikely to happen in Canada. However, underemployed physicians are not only a wasted human resource but also — for example, in the case of low surgical volume — a risk to public health and an unnecessary source of

pressure on the process of allocating public funds across competing uses.

Furthermore, to maintain more entrants into medicine than is warranted simply to provide Canadians with an opportunity to become physicians seems a perverse and costly failure of education and health policy coordination. Those bearing the brunt of the cost would be the same students who interpret the availability of undergraduate MD training opportunities as a signal that the skills with which they will emerge are required and highly valued. As the British Columbia Professional Association of Residents and Internes argued, with considerable justification, during the infamous "billing-numbers" case a few years back, the time to employ overall physician supply policy is at the beginning and not at the end of the educational process.

This brings us to the third and most compelling reason — that a reduction in domestic training would simply result in increasing numbers of foreign medical graduates "taking up the slack." Indeed, in the absence of any other policies this almost certainly would happen. As we have noted before,[4] as long as offshore recruits are seen as solutions to Canadian problems (either at the training or practice stage) policy will continue to avoid dealing directly with the reasons for their recruitment. However, it is the failure of Canadian incentive and training programs to prepare and encourage physicians to practise outside urban centres and of Canadian postgraduate training programs to align their numbers and mix with Canadian needs that creates the opportunities and, indeed, the "needs" for these foreign graduates.

There is nothing in a policy of reducing domestic training per se that automatically implies an increasing need for or supply of foreign graduates. To improve specialty and geographic distribution without an increase in the relative supply of foreign graduates while simultaneously reducing the levels of domestic training is not beyond the reach of a coordinated set of domestic, national policies, although it will require heretofore unseen goodwill, cooperation and coordination among stakeholders. It is a major test for a national physician resource strategy. Our "need" for foreign graduates will be a barometer of our success.[4]

Policy directions

Our discussion suggests that we might do well to put in place a set of policies that would increase the population–physician ratio (even if not all the way up to or even near 857). Since domestic training represents the major source of new supply and the likelihood (and desirability) of completely stemming the inflow of foreign graduates seems questionable[4] such policies must involve the Canadian undergraduate medical training establishment.

In the recommendations in our report we attempted to offer a feasible compromise between what we felt the evidence warranted and what we thought there might be some reasonable hope of achieving. Thus, we recommended that at the very least the decline in the population–physician ratio be arrested. A reduction to about 1600 in annual first-year student enrolment as one component of an overall package of physician resource management initiatives was offered to ensure this and to encourage other initiatives that would guard against foreign graduate fill-in. (We explictly noted that there was no justification for increasing the ratio of foreign to domestic graduates practising in Canada.[4]) This would leave total reductions from the peak of the mid-1980s at less than the recommendations in the recent Federal/Provincial/Territorial Advisory Committee Report[42] and is not inconsistent with the views espoused by leaders of organized medicine and medical education during our interviews.

Although we believe that 1600 is a reasonable and conservative initial figure some may be concerned that this will undershoot the meeting of future needs for various reasons.[43,44] One cause for concern is that Canada has lacked the dynamic information bases and processes and the collaboration between stakeholders that would allow timely and ongoing adjustments. For example, the effectiveness of other policy options — addressing continuing competence and foreign medical graduates — may have a direct impact on overall supply. On balance, however, we believe that the evidence on substitution and the appropriateness of care suggests that there is a huge buffer against such undershooting and that the social costs of overshooting must finally be taken seriously.

There are several well-worn arguments for holding the line on or even expanding domestic training capacity: an aging population, new technology, declining workloads and increasing numbers of female physicians. These assume that all current services are effective and appropriate and reflect considered societal judgements about the allocation of resources to these rather than to other potentially worthwhile activities.[43] We have considered these arguments exhaustively elsewhere[13,14,45] and have found them seriously wanting. We are particularly dismayed at the continued asymmetry in the consideration of factors that might increase future requirements for physicians as compared with those that could be expected to reduce those requirements.[43]

The process of projecting future requirements is not a mechanical, value-free technical exercise. What goes in at the front end in terms of assumptions,

inclusions and exclusions can be tailored to produce *any* result at the back end. Most of the efforts to project requirements have so neglected the sorts of evidence we have touched on that they have eliminated at the outset entire ranges of reasonable estimates of future requirements.

Our specific recommendation on undergraduate enrolment should not be implemented without concurrent policies addressing the issues of graduates of foreign medical schools, the funding of Canadian medical schools and the supply and mix of postgraduate training positions. For example, it is important to ensure that policies on postgraduate and undergraduate capacities are consistent with each other and with Canadian policy on the desired mix of generalist and specialist physicians.

Enrolment reductions must also be accompanied by changes in academic medical centres in who is admitted, what they are taught, where they learn and what contextual information is available to them. The argument that the characteristics of the entering classes influence the career decisions and practice patterns of future physicians seems compelling. An increased emphasis in admissions policy on more broadly based academic performance, nonacademic experiences, deductive abilities, and problem-solving and interpersonal skills may improve the likelihood of solving a variety of physician resource problems, including the proliferation of procedural subspecialists and the concentration of physicians in urban centres. With careful evaluation it seems well worth a try.

A second admissions issue is provincial residency requirements. Applicants are either disadvantaged at or simply do not bother to apply to out-of-province Canadian schools for financial or family reasons or perceived disadvantage.[40] This perception (and, we suspect, the fact) has become an underlying rationale for the maintenance of relative provincial capacities. The reduction or elimination of this preferential selection process would represent an important component of a national strategy on physician resources.

Enrolment and admissions policies that might effectively alter the geographic distribution of physicians include the reservation of a proportion of entry class positions for suitably qualified students from areas with specific shortages or for qualified applicants willing to make a commitment to rural service after licensure. Although not without potential problems (discussed in the full report) they bear consideration. We will return to these options in our article on geographic distribution.

The necessity for rejuvenation of the undergraduate medical curriculum varies considerably across Canada, since the extent to which faculties have implemented structural and content changes has varied during the past decade. There is a critical need to ensure that the curricula are consistent with the training of clinicians who are able to meet population needs. This may mean greater emphasis on mental health, pharmacology, geriatrics, rural practice and other clinical areas that at present receive relatively little attention[46] along with epidemiology and the principles of clinical decision making; but account should also be taken of broader contextual subjects and issues such as medical ethics, the role of medicine in society, the importance of medical and health care as determinants of population health, health economics and medical sociology and anthropology. Finally, if many physicians are expected to be "gatekeepers" for the rest of the medical care system the skills necessary for this role should be identified and taught.

The difficulty will be to strike a balance between existing and revised content. If the curricula cannot be changed to incorporate the new areas and yet society places increasing importance on physicians with these exposures, the criteria on which students are admitted may require re-examination.

Where the curricula are delivered is extremely important to specialty and geographic distribution. Further movement away from the concentration of training in urban, tertiary care hospitals is necessary. This will require the development of affiliation agreements with a much broader range of institutions, community sites and clinical faculty. There are some Canadian family practice programs that have made major advances in this direction in recent years. The ambitious initiative *Educating Future Physicians for Ontario* seems an important step in the right direction, although it will be some time yet before its impact can be appraised.[47,48]

Finally, we recommend that medical students have access to information, including at least the projected national and provincial availability of postgraduate specialty training positions, regional human resource plans, socioeconomic, demographic and disability or health status profiles of the population, physician practice loads and incomes, availability of diagnostic and treatment facilities, and other referral resources. A database containing many of these elements has recently been developed in Belgium. We recognize that all these types of information are not available, but students should be provided with those that are, and we should strive to develop the capability to provide the rest.

Of at least equal importance is the provision of information on the likely context of practice for coming graduates. Included in this might be information on current quality assurance and competency assurance activities of hospitals and provincial licensing authorities, synopses of recent planning and policy documents published by ministries responsi-

ble for funding health care, and information on current investigations or commissions and on the sources of and allocative processes governing public expenditures.

Epilogue

Although much of the media attention and a fair share of the "official" responses to our report have concerned our recommendation on undergraduate medical enrolment, we re-emphasize the need for an integrated approach to policy in this complicated and politically charged area. Without reforms to undergraduate curricula and training location a reduction in undergraduate enrolment will simply exacerbate existing problems. Equally, reforms without reductions will leave in place a host of other policy problems. All aspects of the policy package on medical undergraduate education have a direct bearing on the geographic distribution of physicians. It is to that topic that we turn in our next article.

We are grateful to the many people who provided personal insights into this policy area during our interviews. In particular, the assistance of Jonathan Lomas with the work on these sections of the report is acknowledged.

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Conferences

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Sept. 2-4, 1992: International Conference on Self-Help/Mutual Aid
Government Conference Centre, Ottawa
Canadian Council on Social Development, 55 Parkdale Ave., PO Box 3505, Stn. C, Ottawa, ON K1Y 4G1; (613) 728-1865, fax (613) 728-9387

Sept. 11-12, 1992: Canadian Society for Aesthetic (Cosmetic) Plastic Surgery Annual Meeting
Vancouver
Mrs. Pat Hewitt, executive secretary, Canadian Society for Aesthetic (Cosmetic) Plastic Surgery, 4650 Highway 7, Woodbridge, ON L4L 1S7; (416) 831-7750 or 1-800-263-4429, fax (416) 831-7248

Sept. 11-14, 1992: Canadian Paediatric Society 69th Annual Meeting (in conjunction with the Royal College of Physicians and Surgeons of Canada 61st Annual Meeting)
Chateau Laurier, Ottawa
Preliminary program begins Sept. 9.
Dr. Victor Marchessault, executive vice-president, Canadian Paediatric Society, 401 Smyth Rd., Ottawa, ON K1H 8L1; (613) 737-2728, fax (613) 737-2794

Sept. 11-14, 1992: 61st Annual Meeting of the Royal College of Physicians and Surgeons of Canada (in association with the Canadian Society for Clinical Investigation and approximately 33 other national specialty societies)
Ottawa Congress Centre
Anna Lee Chabot, head, Meetings and Assemblies Section, Office of Fellowship Affairs, Royal College of Physicians and Surgeons of Canada, 74 Stanley St., Ottawa, ON K1M 1P4; (613) 746-8177, fax (613) 746-8833

Sept. 18, 1992: Breastfeeding Seminar for Health Professionals (sponsored by the La Leche League of Quebec and Eastern Ontario)
Ottawa Civic Hospital
Agnes Vargha, conference coordinator, 25 Bernier Terr. Kanata, ON K2L 2V1; (613) 592-2379

Sept. 21-25, 1992: Interaction '92 — Annual Scientific Meeting of the Occupational Medical Association of Canada (held in conjunction with the Ontario Occupational Health Nurses Association)
Ottawa
Executive director, 605-302 The East Mall, Etobicoke, ON M9B 6C7; (416) 239-6462

Sept. 22-25, 1992: 1st International Symposium on Brain Death
International Conference Center, Havana, Cuba
Official languages: English and Spanish
1er Simposio Internacional sobre Muerte Encefálica, Palacio de las Convenciones, Apartado 16046, La Habana, Cuba

Du 1 au 3 oct. : L'Association canadienne pour la prévention du suicide (ACPS) Congrès 1992 — Le suicide et la famille
Delta Bessborough Hotel, Saskatoon
Congrès 1992 de la ACPS, 1410-12th St. W, Saskatoon, SK S7M 0Z4; (306) 664-4525, fax (306) 664-1974

Oct. 1-3, 1992: Canadian Association for Suicide Prevention (CASP) '92 Conference — Suicide and the Family
Delta Bessborough Hotel, Saskatoon
CASP Conference '92, 1410-20th St. W, Saskatoon, SK S7M 0Z4; (306) 664-4525, fax (306) 664-1974

Oct. 2-3, 1992: The Meeting of Medical Traditions in New Spain (a joint project of the National Library of Medicine and the University of California)
University of California — Los Angeles
Susanne M. Kahle, assistant to the director, 1992 Quincentenary Programs, 212 Royce Hall, University of California — Los Angeles, 405 Hilgard Ave., Los Angeles, CA 90024; (310) 206-1305

Oct. 5-6, 1992: 11th International Congress on Objective Assessment in Rehabilitation Medicine
Hotel Sheraton Centre, Montreal
Centre de formation en réadaptation du Québec, 6300 Darlington Ave., Montreal, PQ H3S 2J4; (514) 340-2089, fax (514) 340-2149

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